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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,048

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Joachim Berthold

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EXAMINER

SINGH, PREM C

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,048	Applicant(s) BERTHOLD ET AL.	
	Examiner PREM C. SINGH	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Amendment to claims 11, 14-19, 21 and 22 and addition of new claims 23-24 is noted.
2. New ground of rejection necessitated by amendment to the claims and addition of new claims follows.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 11-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Promel et al (US Patent 6,225,421) ("Promel") in view of Job et al (US 2002/0128401) ("Job").

5. With respect to claims 11, 23 and 24, Promel discloses a suspension process for preparing ethylene polymers (See column 1, lines 48-58; column 3, lines 5-10) having a bimodal mass distribution from a monomer and at a comonomer (See column 1, lines 5-9, 63-67; column 2, lines 1-4; column 6, lines 25-27) in at least two reactors which are connected in series (See column 1, lines 48-51) and comprise different reaction conditions within each of the reactors (See column 12, Table 5) wherein the process comprises:

- collecting off gases leaving all the reactors (See column 5, lines 28-31);

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- compressing the off gases in a compression stage to produce compressed offgases (See column 5, lines 28-32);
- passing the off gases to a distillation column to produce a gaseous fraction and a liquid fraction (See column 5, lines 28-37); and
- re-circulating the gaseous fraction and liquid fraction into the suspension process (See column 5, lines 37-40).

Promel further discloses using hydrogen, inert and the monomer in the first stage of the reactor (See column 3, lines 11-16, 26-36), separation of inert, ethylene and hydrogen from the polymer composition and recycle of liquid to the downstream reactor and gases to the first stage of the reactor (See column 5, lines 20-25, 33-40). Promel discloses that the suspension is subjected to a reduction in pressure so as to remove the diluent, the ethylene, the hexene, and hydrogen (See column 5, lines 22-25). It is to be noted that the reduction in pressure is expected to be done by any standard device, including a regulatable valve as claimed. It is also expected that the recycle gases will be recycled to the first reactor by an appropriate device, including a regulatable valve.

Promel also discloses a good yield with low content of oligomers generally comprising at least 99 wt% of the combination of homopolymer and copolymer (See column 5, lines 41-45; column 6, lines 10-15). Promel's silence on after-reactor clearly indicates that the invention avoids an after-reactor.

It is to be noted that Promel produces the polymer in a plant (See Examples 8, 9R, 10), which is expected to be a continuous process.

Promel invention does not specifically disclose cooling of the compressed off-gases, however, the invention does disclose using a distillation column to separate the compressed gaseous mixture into liquid and gas and recycling to the reactor.

Job discloses a process of olefin polymerization using a feed, catalyst and operating conditions (See paragraph 0032, 0073, 0075) similar to Promel. Job also discloses that it is preferred to condense at least a portion of the recycle stream (See paragraph 0074). Job also discloses removal of hydrogen, inert and unreacted olefin from the reaction products and recycle to the reactor (See paragraph 0076, 000079). Job further discloses that a stream containing unreacted monomer is withdrawn from the reactor continuously, compressed, cooled, partly or fully condensed and recycled to the reactor (See paragraph 0076). This indicates that the cooling is conducted by an appropriate device, including in a gas scrubber as claimed.

In view of Job's preferred step of condensing a portion of recycle stream, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel process and use a cooling step instead of distillation, to partially condense the recycle stream. Omission of distillation column and use of a cooling step will provide an economical polymerization process.

6. With respect to claims 12-14, Promel invention does not appear to specifically disclose the pressure and temperature of the compressed gases, however, the invention does disclose pressure and temperature during polymerization reaction (See

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column 4, lines 64-67; column 5, lines 1-5) and also pressure and temperature reduction during degassing (See column 3, lines 37-47). Since, Promel is compressing the gases before taking to the distillation column (See column 5, lines 28-32) (or, to a cooling step as modified by Job), it would have been obvious to one with ordinary skill in the art at the time of invention to specify the pressure and temperature after compression for proper control of off-gases before being recycled. It is expected that Promel should be using pressure and temperature conditions of the compressed gases in a range as claimed, because Promel is using pressure and temperature conditions in the reactor in the claimed range.

7. With respect to claims 15-17, Promel invention does not appear to specifically disclose the temperature and pressure of the off gases after cooling, however, the invention does disclose the separation of off gases into gaseous and liquid products in a distillation column (See column 5, lines 32-37) (or, in a cooling step, as modified by Job). As discussed under claim 11, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel invention and use a cooling step instead of a distillation column for an economical process. It would also have been obvious to cool the off gases in the cooling step at a temperature and pressure in an appropriate range including as claimed, for an effective separation of off gases into liquid and gaseous components.

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8. With respect to claim 18, Promel invention discloses use of hydrogen and transition metal catalysts, including Ti and Zr, in the suspension process (See column 3, lines 31-36; column 4, lines 16-25), however, the invention does not appear to specifically disclose use of Ziegler-Natta catalyst.

Job discloses use of Ziegler-Natta catalyst species which denotes any of the known metal species useful in polymerizing olefins that are present in Ziegler-Natta catalysts. For example, the species can include Ti, Hf, V, Cr, Zr and the like (See paragraph 0032). Obviously, combined Promel and Job's disclosure indicates that one with ordinary skill in the art would use any transition metal or Ziegler-Natta catalyst in the olefin polymerization because Ziegler-Natta catalyst comprises transition metals.

9. With respect to claim 19, Promel invention discloses a first reactor comprising hydrogen and at least one comonomer (1-hexene), the hydrogen being present in a concentration higher than the hydrogen concentration in the downstream reactor, and the comonomer (1-hexene) concentration in the first reactor being lower than the comonomer concentration in the downstream reactor (See column 3, lines 31-36, 53-65 column 4, lines 1-15; Table 1).

10. With respect to claim 20, Promel discloses production of a polyolefin polymer comprising ethylene and a polyolefin polymer of an alpha-olefin comprising 6 carbon atoms (1-hexene) (See Table 1, 2).

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11. With respect to claim 21, Promel discloses suspension medium comprising a saturated hydrocarbon comprising from 3 to 8 carbon atoms (See column 3, lines 5-17).

12. With respect to claim 22, Promel discloses removing hydrogen and inert gas from the suspension process (See column 3, lines 37-40; column 5, lines 28-40).

Although Promel invention does not appear to specifically disclose branching off of the offgas stream from the first reactor, however, the invention does disclose that the first reactor, in comparison to the second reactor, has higher concentration of hydrogen and lower concentration of monomer and comonomer (See column 3, lines 31-36, 53-65; column 4, lines 1-15; Table 1). Promel also discloses that the ratio of the concentration of hydrogen in the diluent in the first reactor to the concentration in the subsequent polymerization reactor is about 200 (See column 3, lines 61-67). This indicates that the hydrogen requirement in the subsequent reactor(s) diminishes sharply, and it would have been obvious to one with ordinary skill in the art at the time of invention to modify Promel invention and branch off the offgas from the first reactor to reduce hydrogen fed to the subsequent reactor(s).

Response to Arguments

13. Applicant's arguments filed 06/14/2010 have been fully considered but they are not persuasive.

14. In the arguments on page 7-8, the Applicant argues that:

Promel does not disclose separating components of the offgases by compressing and cooling the offgases. Promel uses a distillation column to separate the offgases into three streams. In addition, Promel does not suggest the composition of the gaseous fraction obtained according to the processes of Applicants invention, which comprise inert gas, hydrogen and monomer. Job does not teach separating the offgases from a polymerization reactor at all. The objective achieved by condensation in Job's teachings is to remove heat in the fluidized bed reactor. Applicants' invention is a process that comprises separating the offgases by compression and cooling to form a gaseous fraction and a liquid fraction with each fraction has specifically defined compositions. Therefore, Job teaches away from the Applicants' invention.

In response, it is the examiner's position that Promel discloses that the polymer suspension is subjected to a reduction in pressure so as to remove the diluent (inert), the ethylene (monomer), the hexene (comonomer), and hydrogen (See column 5, lines 22-25). It is recognized that Promel teaches distillation of the compressed mixture and not cooling. Job discloses separation of off-gases from a polymerization reactor (See paragraph 0073-0075). Job further discloses that a stream containing unreacted monomer is withdrawn from the reactor continuously, compressed, cooled, partly or fully condensed and recycled to the reactor (See paragraph 0076). Job also discloses presence of monomer, hydrogen and inert in the polymerization reactor effluent (See paragraph 0079).

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15. In the arguments on page 8, the Applicant argues that:

Neither Promel nor Job teaches the elements of amended claim 11. The process of the Applicants' invention uses a simple method of compression in combination with a cooling step to separate the offgases into two fractions: a gaseous fraction and a liquid fraction. The gaseous fraction comprises an inert gas, hydrogen, and the monomer. The liquid fraction comprises the comonomer and the suspension medium. The invention comprises separating the gaseous fraction from the liquid fraction, recirculating the gaseous phase into the first reactor, and recirculating the liquid fraction to at least one of the downstream reactors, thereby achieving greater than 98% yield without the use of an after-reactor.

In response, it is the examiner's position that the combined teaching of Promel and Job discloses compression in combination with a cooling step to separate the offgases comprising an inert gas, hydrogen, and the monomer and discussed earlier. Re-circulation of the liquid and gases from the reactor effluent has been addressed in the Office action above under claim 11.

16. In conclusion, the claimed invention is *prima facie* obvious over Promel in view of Job.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/PREM C SINGH/
Examiner, Art Unit 1797